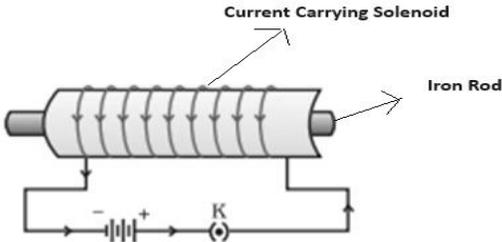


MARKING SCHEME
Secondary School Examination, 2024
SCIENCE (Subject Code–086)
[Paper Code: 31/3/1]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
SECTION A			
1	(A) / Quick lime	1	1
2	(B) / Turmeric and litmus	1	1
3	(A) / Washing Soda	1	1
4	(B)	1	1
5	(A) / 1, 6, 2 and 3	1	1
6	(B) / C ₇ H ₁₄	1	1
7	(B) / CaO + H ₂ O → Ca(OH) ₂	1	1
8	(D) / Cytokinins	1	1
9	(C) / Petals only	1	1
10	(C) / 9 : 3 : 3 : 1	1	1
11	(C) / (b) and (c)	1	1
12	(A) / Tt and Tt	1	1
13	(D) / Dispersion, refraction and internal reflection	1	1
14	(D) / 4D and 2L	1	1
15	(A) / 2 trophic levels	1	1
16	(B) / (a) and (c)	1	1
17	(C) / Assertion (A) is true, but Reason (R) is false	1	1
18	(A) / Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A)	1	1
19	(C) / Assertion (A) is true, but Reason (R) is false	1	1
20	(B) / Both Assertion (A) and Reason (R) are true, but Reason (R) is <i>not</i> the correct explanation of Assertion (A).	1	1
SECTION B			
21	<ul style="list-style-type: none"> • 2 Mg + O₂ → 2 MgO • Magnesium oxide • Type – Combination reaction • Reason : Two or more substances combine to form a single product . 	½ ½ ½ ½	2
22	<ul style="list-style-type: none"> • Synthesized at shoot tip/root tip • When light falls on one side of the plant, auxin diffuses towards the shady side of shoot. The concentration of auxin stimulates the cells to grow longer on the side of shoot which is away from light. Thus plant appears bent towards light/phototropism. 	½ 1½	2

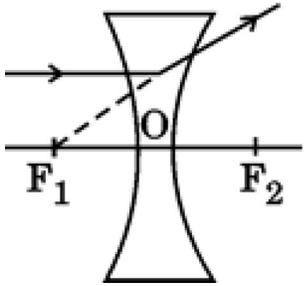
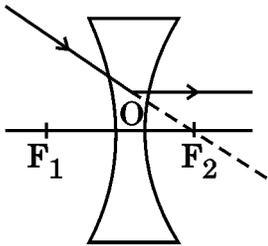
23	<p>(a) 2 visible characters of garden pea plants are :</p> <ul style="list-style-type: none"> • Tallness (dominant) , Dwarfness (recessive) • Yellow seeds (dominant) , Green seeds (recessive) <p style="text-align: right;">(Any other pair)</p> <p style="text-align: center;">OR</p> <p>(b)</p>	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
24	<ul style="list-style-type: none"> • When he cannot see nearby objects distinctly but can see far object clearly. • 2 causes: Focal length of the eye lens is too long. Eyeball becomes too small. • Convex or Converging lens 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
25	<p>(a)</p> <p style="text-align: center;">Fig.12.6(a) on page 199-NCERT</p> <p style="text-align: right;">Diagram: Directions of current and magnetic field:</p>	$\frac{1}{2} + \frac{1}{2}$	1

	OR		
	<p>(b)</p> <ul style="list-style-type: none"> • Permanent magnet / Current carrying solenoid/ Electromagnet • <div style="text-align: center;">  <p>Fig-12.11, page no.201-NCERT</p> </div> <p style="text-align: right;">Diagram: Labelling:</p>	<p>1/2</p> <p>1 1/2</p>	<p>2</p>
26	<ul style="list-style-type: none"> • Decomposers are the microorganisms that break-down the complex organic substances into simple inorganic substances. <p>Consequences :</p> <ul style="list-style-type: none"> (i) No replenishment of soil (ii) Foul smell (iii) Breeding of flies (iv) Accumulation of dead plants and animals in the environment. (v) No recycling of nutrients <p style="text-align: right;">(Any two or any other)</p>	<p>1</p> <p>1/2 + 1/2</p>	<p>2</p>
	SECTION C		
27	<p>(a) Amphoteric oxide (zinc oxide) reacts with acids as well as bases to produce salt and water.</p> <p>(b) If kept in open, sodium metal reacts vigorously with air and catches fire / kerosene oil does not allow sodium to come in contact with air and catch fire.</p> <p>(c) Nitric acid is a strong oxidising agent. It oxidises the hydrogen produced in the reaction to water.</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
28	<p>(a)</p> <ul style="list-style-type: none"> (i) Reduction Process- Roasting 	<p>1/2</p>	

	<p>Reason- Mercury has low reactivity.</p> <p>(ii) Reduction Process- Roasting Reason- Copper has low reactivity.</p> <p>(iii) Reduction Process- Electrolytic Reduction. Reason- Sodium has high reactivity</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i) Change in appearance - White to black colour. Reason- Silver sulphide is formed.</p> <p>(ii) Change in appearance – Reddish brown to green colour. Reason- Basic Copper Carbonate is formed.</p> <p>(iii) Change in appearance- Grey to brown colour. Reason- Rust (iron oxide) is formed.</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p>	<p>3</p>
29	When water is lost through stomata in the leaves by transpiration, it creates a suction force/transpiration pull, due to which water is pulled up through xylem of the roots to the leaves.	1+1+1	3
30	<p>(a) Constituents:- Brain and Spinal cord.</p> <p>Protection:- Brain – Bony box/in skull/Cranium/fluid filled balloon. Spinal Cord – Vertebral column.</p> <p>(b) Limitations :</p> <p>(i) They will reach only those cells that are connected by nervous tissue, not each and every cell in the animal body.</p> <p>(ii) Once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanisms before it can generate and transmit a new impulse.</p> <p style="text-align: right;">(Any other)</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	3
31	<ul style="list-style-type: none"> • Scattering of light / Tyndall effect • When a beam of light strikes fine particles of smoke, it is reflected diffusely and the path of the light becomes visible. • Very fine particles scatter mainly blue light/short wavelength colours while the particles of larger size scatter longer wavelength colours. 	<p>1</p> <p>1</p> <p>1</p>	3
32	<ul style="list-style-type: none"> • It prevents damage to the appliances and the electrical circuit from overloading and short circuiting. 	1	

	<ul style="list-style-type: none"> Here $P = 3 \text{ kW} = 3000 \text{ W}$, $V = 220 \text{ V}$, $I = ?$ $P = VI$ $I = \frac{P}{V} = \frac{3000 \text{ W}}{220 \text{ V}} = 13.63 \text{ A}$ <p>$13.63 \text{ A} >$ Rating of fuse 5 A, therefore fuse wire will melt and break the circuit.</p>	$\frac{1}{2}$ 1 $\frac{1}{2}$	3
33	<p>(a) Ohm's Law – The potential difference, V, across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it, provided its temperature remains the same.</p> <p>Formula :- $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$</p> <p>(b) $R + \frac{R}{2} = \frac{3R}{2}$</p>	1 1 1	3
SECTION D			
34	<p>(a) (i)</p> <p>(1) Solution B</p> <p>(2) Solution C</p> <p>(3) Solution A</p> <p>(4) Solution D</p> <p>(5) Solution E</p> <p>Increasing Order of H^+ ion concentration :- $C < E < D < A < B$</p> <p>(ii) (1) Acidic salt : Ammonium chloride; NH_4Cl Parent Acid-Hydrochloric acid /HCl Parent Base- Ammonium hydroxide/(NH_4OH)</p> <p>(2) Basic salt : Sodium Carbonate; Na_2CO_3 Parent Acid-Carbonic acid / H_2CO_3 Parent Base- Sodium hydroxide/ NaOH</p> <p style="text-align: right;">(Or Any other)</p>	$\frac{1}{2} \times 5$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	

	OR		
	<p>(b) Chlor – alkali process;</p> <ul style="list-style-type: none"> When electricity is passed through NaCl (aq) it decomposes to form sodium hydroxide / $2\text{NaCl} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{Cl}_2 + \text{H}_2$ X – Cl_2 gas – at anode Y – H_2 gas – at cathode <p style="text-align: center;"><i>(award marks if explained by diagram)</i></p> <ul style="list-style-type: none"> Z – Bleaching powder / CaOCl_2 / Calcium Oxychloride $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \longrightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$ (Bleaching powder) 	<p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p>	5
35	<p>(a)</p> <p>(i)</p> <ul style="list-style-type: none"> Spores are reproductive structures that detach from the parent and give rise to a new individual. Sporangium / Sporangia Covered by thick walls to protect them from unfavourable conditions. Rhizopus <p>(ii)</p> <ul style="list-style-type: none"> Plants which have lost the capacity to produce seeds. Plants bear flowers and fruits earlier so as to reduce time. To get genetically similar plants. <p style="text-align: right;">(Any two or any Other)</p> <ul style="list-style-type: none"> Methods Layering and Grafting <p style="text-align: right;">(Or any other)</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i)</p> <ul style="list-style-type: none"> A – Male Germ Cell/Male Gamete; B – Pollen tube; C – Female Germ Cell / Female Gamete. B carries A (male germ cell) and this germ cell fuses with C (female germ cell) to form a zygote. Significance: Zygote is capable of growing into a new plant. 	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1 + 1</p> <p>1</p> <p>$\frac{1}{2} \times 3$</p> <p>1</p> <p>$\frac{1}{2}$</p>	

	<p>(ii) Post fertilisation changes: -</p> <ul style="list-style-type: none"> • Zygote divides many times to form an embryo within ovule. • Ovule is converted into seed • Ovary ripens into fruit. • Petals, Sepals, Stamens, Style and Stigma may shrivel/dry and may fall off. 	½ x 4	5
36	<p>(a) (i)</p> <p>(1)</p>  <p>Fig.9.13(b)-Page-153, NCERT.</p> <p>(2)</p>  <p>Fig.9.14(b)-Page-154, NCERT.</p> <p>(Note:- Deduct half mark if directions of rays are not shown)</p> <p>(ii) Given $u = -16$ cm, $f = +24$ cm, $h = 4$ cm</p> <p>Formula used $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$</p> $\therefore \frac{1}{v} - \frac{1}{(-16)} = \frac{1}{+24}$ $\frac{1}{v} = \frac{-1}{48}$	1	1
		½	½

$$v = -48 \text{ cm}$$

Image is formed on the same side as the object

$$m = \frac{h'}{h} = \frac{v}{u}$$

$$\frac{h'}{4} = \frac{-48}{-16}$$

$$h' = 12 \text{ cm}$$

1

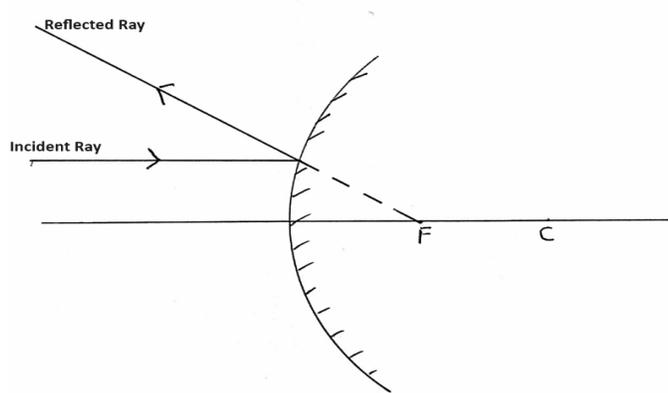
$\frac{1}{2}$

$\frac{1}{2}$

OR

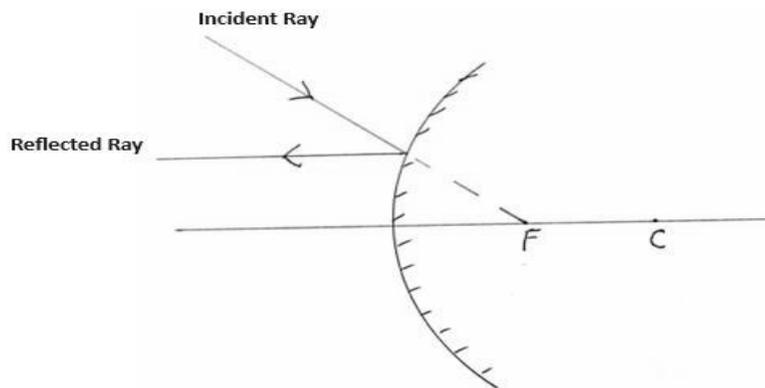
(b) (i)

(1)



1

(2)



1

(Note:- Deduct half mark if directions of rays are not shown)

	(ii) Here $f = -12$ cm, $u = -18$ cm, $v = ?$, $h = 1.5$ cm, $h' = ?$	$\frac{1}{2}$	
	Mirror formula $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$	$\frac{1}{2}$	
	$\therefore \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$		5
	$= \frac{1}{-12 \text{ cm}} - \frac{1}{-18 \text{ cm}}$		
	$= \frac{-1}{36}$		
	$\therefore v = -36$ cm	1	
	$m = \frac{h'}{h} = -\frac{v}{u}$	$\frac{1}{2}$	
	$\frac{h'}{1.5} = -\frac{(-36)}{(-18)}$		
	$h' = -3.0$ cm	$\frac{1}{2}$	
SECTION E			
37	(a) <ul style="list-style-type: none"> • CH_3Br • $\text{C}_2\text{H}_5\text{Br}$ 	$\frac{1}{2}$ $\frac{1}{2}$	
	(b) (i) Aldehyde (ii) Ketone	$\frac{1}{2}$ $\frac{1}{2}$	
	(c) <ul style="list-style-type: none"> • The colour of KMnO_4 disappears; • KMnO_4 acts as an oxidizing agent. 	$\frac{1}{2}$ $\frac{1}{2}$	
	<ul style="list-style-type: none"> • $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{Alkaline KMnO}_4 + \text{Heat}} \text{CH}_3\text{COOH}$ 	1	4
	OR		
	(c) <ul style="list-style-type: none"> • Ethene Conc. H_2SO_4 acts as a dehydrating agent. 	$\frac{1}{2}$ $\frac{1}{2}$	
	<ul style="list-style-type: none"> • $\text{C}_2\text{H}_5\text{OH} \xrightarrow[443 \text{ K}]{\text{Conc. H}_2\text{SO}_4 + \text{Heat}} \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O}$ 	1	
38	(a) Salivary glands; Starch / Carbohydrate	$\frac{1}{2} + \frac{1}{2}$	

	<p>(b) Stomach, Anus</p> <p>(c)</p> <p>(i) The inner lining of the stomach will not be protected from the action of acid.</p> <p>(ii) Digested food will not be absorbed. / Absorption area will be reduced</p> <p style="text-align: center;">OR</p> <p>(c)</p> <ul style="list-style-type: none"> • Emulsification of fats. • Acidic medium has to be made alkaline for the pancreatic enzymes to act. 	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	4
39	<p>(a)</p> <p>(i) Bulb A glows</p> <p>(ii) Bulbs B, C, D and E glow</p> <p>(b) $P = V \times I$ $11 = 55 \times I$ $I = \frac{1}{5} = 0.2 \text{ amp}$</p> <p>(c)</p> <p>(i) Resistance of bulb B, $R = \frac{V}{I} = \frac{55 \text{ V}}{0.2 \text{ A}} = 275 \Omega$</p> <p style="text-align: center;">(alternative formula for calculation $R = \frac{V^2}{P}$)</p> <p>(ii) Total resistance of the series combination of four bulbs $= 4 \times 275 = 1100 \Omega$</p> <p style="text-align: center;">OR</p> <p>(c)</p> <ul style="list-style-type: none"> • Bulb A will keep glowing with same brightness. • Other bulbs i.e., B, D and E will stop glowing. <p>• Reason:</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	

	As the bulbs B, D and E are connected in series with fused bulb C, so no current flows through them and thus they will not glow. The bulb A remains unaffected as it is connected in parallel combination.	1	4
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